
INSPECTION PROCEDURE 88200 APPENDIX L

INSPECTION OF FIRE PROTECTION SYSTEMS UNDER CONSTRUCTION AT FUEL CYCLE FACILITIES

Effective Date: May 28, 2025

88200.L-01 INSPECTION OBJECTIVES

- 01.01 To determine if safety-significant fire protection system work is being performed in accordance with regulatory requirements, the licensing basis, specifications, drawings, and work procedures.
- 01.02 To determine if the applicant/licensee's system for preparing, reviewing, and maintaining records relative to safety-significant fire protection system activities reflect work accomplishment consistent with specifications and procedures.
- 01.03 To determine if the as-built condition of safety-significant fire protection systems meet the specified design requirements, specifications, and drawings.
- 01.04 To determine if the implementation of the management measures related to work activities for safety-significant fire protection systems associated with items relied-on for safety (IROFS) is effective and to verify that deviations from requirements are appropriately resolved.

88200.L-02 INSPECTION REQUIREMENTS

- 02.01 For the safety-significant fire protection systems selected for inspection, determine whether procedures exist in the following areas, are compatible with the management measures program for IROFS, and prescribe adequate methods to meet the licensing basis and construction specifications, where applicable:
 - a. procurement
 - b. receipt inspection
 - c. storage
 - d. installation
 - e. construction quality control inspection
 - f. construction testing and calibration
 - g. configuration management
- 02.02 Determine whether the applicant/licensee has an established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements, as applicable in their licensing basis, in the area of fire protection systems, and for ensuring that examination, inspection, and if required, test personnel associated with performing tests and inspections of safety-significant activities are qualified and/or certified to perform their assigned work.

02.03 Ascertain whether the following safety-significant fire protection systems, as required by licensing commitments and applicable construction codes, are being controlled and accomplished in accordance with the requirements of the documents reviewed in 02.01, above:

- a. receipt inspection
- b. storage and handling
- c. installation activities
- d. construction testing
- e. configuration management

02.04 Review the documentation generated for the safety-significant fire protection systems, as required by the licensing basis. Determine whether the applicant/licensee/contractor system for documenting safety-significant work is functioning in accordance with requirements. Records should be complete, reviewed by quality control, engineering personnel, or designee, as required, and readily retrievable.

- a. receipt inspection and material certification
- b. installation inspection
- c. construction testing
- d. nonconformance/deviation record(s)
- e. training/qualification records of craft, and quality inspection personnel (as required)
- f. configuration management records

88200.L-03 INSPECTION GUIDANCE

General Guidance

Inspectors should review the facility description in the integrated safety analysis, integrated safety analysis summary, or equivalent and be familiar with the safety-significant items and services (SSIS) being constructed at the site. The purpose of these as-built inspections is to verify that the assumptions and critical attributes reviewed during the licensing review process remain valid; the design was appropriately translated to construction specifications; the licensee/applicant constructed the facility in accordance with these specifications; and any modifications performed complies with the licensee's configuration management program and does not impact any NRC licensing decisions.

For the purpose of this appendix, a "Fire-Loop" is a main water piping loop for fire protection, usually feeding hydrants, standpipes, and other fire protection systems and components. Fire-loops are provided to permit feeding hydrants and other components and systems, from at least two directions, for redundancy.

Inspectors should also be familiar with the licensee's management measures and/or quality assurance program, if applicable, and the licensing basis associated with these measures. It is not the objective of this inspection procedure (IP) to verify the adequacy of the applicant/licensee's management measures program, but inspectors should be prepared to identify potential gaps in the implementation of management measures for future inspections. Inspectors should complete this appendix by inspecting the attributes listed in this appendix for as-built fire protection system work with a focus on SSIS, such as IROFS, or regulatory requirements, as applicable.

Inspectors should contact the applicant/licensee prior to the onsite inspection to help determine what samples are to be inspected. Observation during in-progress activities, like construction, installation, and testing, is desirable but not required. If necessary, inspectors may select completed systems for inspection. Inspectors should not attempt to inspect all available samples but may expand if significant concerns with the applicant/licensee's control of installation/construction arise in this functional area.

Inspectors should collect applicant/licensee procedures, specifications, and work completion records in advance. If unable to review these documents in advance of the onsite inspection, then the licensee should be notified that these documents, and any other relevant documents, should be available when the inspector(s) arrives at the site.

Inspectors should choose one or more safety-significant fire protection systems and review the areas listed in Inspection Requirements 02.01 through 02.04 to the extent practical and may use their judgment in determining which areas to concentrate on if time is limited.

03.01 Inspection Requirement 02.01

- a. Review construction specifications related to safety-significant fire protection systems and ascertain whether the specified technical requirements conform to the commitments contained in the licensing basis.
- b. Review fire protection systems procedures and as applicable, verify that they specify provisions for adequate onsite engineering direction, are appropriate and adequate related to procurement and use of materials, specify adequate control of hold points, and provide adequate controls for design changes and incorporation of design changes into as-built drawings.
- c. Review the IPs and compare with the requirements in the applicable codes and construction specifications. Evaluation should indicate whether adequate quality-related IPs are established and are based on appropriate criteria, and further, whether the results of the licensee's inspection will be transmitted to responsible quality assurance and management personnel.
- d. Determine if appropriate and adequate procedures in the following areas are compatible with the management measures program, and prescribe adequate methods to meet the construction specifications, where applicable:
 1. Procurement. Review the design and purchase specifications and drawings to assure that specific technical requirements and commitments contained in the licensing basis documents have been translated into vendor purchase documents.
 2. Receipt inspection. Receiving inspection and related procedures provide means to ensure the received components are as specified, properly identified, and controlled or otherwise noted; and the requirements contained in the approved management measures program document, or other applicable licensing commitments, as applicable, have been adequately translated into the licensee's receipt IPs.
 3. Storage and handling. Storage procedures provide means to ensure the following:
 - (a) The proper storage environments (as specified by the construction specifications and the manufacturers) are established for the various types of fire protection

system components and meet applicable storage-classification levels, regardless of the location of the stored component.

- (b) Storage IPs require initial verification of storage conditions and periodic verifications for the duration of the storage period. They should also ensure that special and in-place storage requirements are met.
4. Installation. Verify that the fire suppression systems, as specified in the licensing basis, have installation work procedures that provide adequate instructions for the following (if applicable):
- (a) There are procedural controls of rigging and handling activities, to prevent damage to pipes, fittings, valves, and other equipment.
 - (b) Proper locations of valves, hydrants, mains, etc., are clearly identified.
 - (c) Fire-pump installation instructions comply with National Fire Protection Association (NFPA) 20. Separation and protection are in accordance with licensing requirements, and/or other licensing basis commitments.
 - (d) Dimensional checks are specified for levelness, alignment, clearances, etc.
 - (e) Installation instructions of hydrants is in compliance with NFPA 24, as applicable, and/or other licensing basis commitments.
 - (f) Proper backfill methods are specified.
 - (g) Water-tank installation instructions are in accordance with NFPA 22 standards, as applicable, and/or other licensing basis commitments.
 - (h) Proper flushing and hydrostatic testing of the fire-loop water piping are specified.
5. Construction testing. The intent of this requirement is to determine whether adequate management measure procedures have been established to assure that the required testing is satisfactorily completed and corrective action, if required, is properly performed. Procedures are established to ensure that special conditions of testing components (prerequisites, sequence, special handling, removal, precautions, etc.) are included and described in proper detail, as required to conduct and monitor the work performed, including the following, as applicable:
- (a) Equipment and systems to be tested and the related test procedures are properly identified and controlled. Procedures specify which construction tests are to be performed on each component requiring testing.
 - (b) Proper type of test equipment (range, accuracy, etc.) is specified.
 - (c) Type of data to be recorded and method of reporting results.
 - (d) Review and evaluation of test results by qualified personnel.
 - (e) Testing techniques are appropriate for the component to be tested.

- (f) Controls are included for removal and handling of components during testing activities.
- (g) Process for resolution of discrepancies.
- 6. Configuration management. For the procedure review, consider the following attributes:
 - (a) Controls to ensure that the type and classification of fire protection system comply with approved drawings and/or specifications and meet licensee commitments.
 - (b) For IROFS, determine if procedures are compatible with the management measures program, and prescribe adequate methods to meet the construction specifications.

03.02 Inspection Requirement 02.02

- a. Review applicant/licensee's established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements, as applicable, in their licensing basis, in the area of safety-significant fire protection systems.
- b. Review audit program to verify if examination, inspection, and if required, test personnel associated with performing tests and inspections of fire protection systems are qualified and/or certified to perform their assigned work.
- c. Verify records establish that required audits, as applicable, were performed and that deficiencies identified during audits were tracked and corrected.

03.03 Inspection Requirement 02.03

- a. Inspection of selected fire protection systems listed below may be accomplished by observation, record review and/or independent evaluation of in-process and/or completed work. Sample selection should be based on importance to operational safety and should include redundant components and a diversity of components and locations if practical. Before inspection of selected items, review the specifications, drawings, work procedures, management measure procedures, and work schedules applicable to the safety-significant welding activities selected for inspection.
- b. Ascertain whether the following applicable safety-significant fire protection system activities, as required by licensing commitments and applicable construction codes, are being controlled and accomplished in accordance with the requirements of the documents reviewed in 02.01, above:
 - 1. Receipt inspection. Review a sample of receipt inspection reports for major components of fire protection systems and verify receipt inspection requirements have been implemented. The inspectors should select a sample of procurement documents regarding: specifications and drawings, various components such as ductwork, fans, motors, dampers, high efficiency particulate air (HEPA) filters, air handling units (AHU), instrumentation, and radiation, smoke, and toxic chemical monitors. Verify that these documents specify the shape, size, dimension, and

material type and grade, and the certificate of conformance certifies the components meets the construction, material, test, and qualification requirements.

2. Storage and handling. Verify conformance with storage administrative controls and technical requirements for various components such as ductwork, fans, motors, dampers, HEPA filters, AHU, instrumentation, and radiation, smoke, and toxic chemical monitors. The inspectors should ensure storage and warehousing procedures for fire protection system components, and/or the procurement documents reviewed require the following:
 - (a) Access is controlled to the storage area to maintain the quality of the materials received.
 - (b) An adequate marking system is used to maintain the identity of material in storage.
 - (c) Material is protected from the environment and weather, as appropriate. Structural steel for supports is protected from corrosion.
 - (d) Nonconforming material is segregated.
 - (e) Motors, dampers, and heaters are checked to ensure wrappings are not disturbed and items are not removed from storage without proper authority.
 - (f) HEPA filters are stored in their original cartons in an environmentally controlled room.
3. Installation activities.
 - (a) In-Progress Activities. If work is in progress at the time of the inspection, witness a sample of the installation activities of safety-significant fire protection systems, to verify the following, as applicable: the latest issue (revision) of applicable drawings or procedures is available to the installers and is being used; and modifications to supports are approved by appropriate personnel before implementation. Verify that the fire suppression systems, as specified in the licensing basis, have been properly installed for the following (if applicable):
 - (1) Installation work is to be done by fully experienced, responsible persons.
 - (2) There are controls of rigging and handling activities, to prevent damage to pipes, fittings, valves, and other equipment.
 - (3) Proper locations of valves, hydrants, mains, etc., are clearly identified.
 - (4) Dimensional checks are completed for levelness, alignment, clearances, etc.
 - (5) Proper restraints are provided for all tees, plugs, caps, bends, and hydrant branches.
 - (6) Proper backfill methods are performed.
 - (7) Visually examine a sample of pipes, fittings, valves, and hydrants before installation. Plain ends should be inspected with special attention, since these

ends are most susceptible to damage. Verify that commitments in the licensing basis, as applicable, are being met in the following areas:

- Configuration of loop and appurtenances, relative to drawings;
- Obvious defects, such as cracks and dents, are identified and evaluated for suitability for use; and
- There are provisions for proper identification of components.

(b) As-Built Verification.

(1) Observe a sample of the completed installation of the following equipment for proper location, configuration, identification, and damage. The basis for this determination should be the licensing bases documents, piping and instrumentation diagrams, specifications, and installation drawings. Select from the list below, as applicable:

- seismic support for ductwork;
- ductwork;
- isolation dampers;
- recirculation test loops around fans and isolation dampers;
- radiation, smoke, and toxic chemical monitor;
- pressure-drop instrumentation across filter banks;
- instrumentation for the detection of excess ambient temperature;
- fresh air intake elevation from grade level;
- fans and motors;
- air handling units;
- exhaust vents; and
- filters.

(2) Observe completed installation of the fire-loop (if applicable). Verify the following items:

- Components are installed with proper location and orientation.
- All specified anchors are in proper places.
- No apparent damage was done to fire-loop components during installation.
- There is adequate construction quality control inspection coverage, as applicable.
- Fire-pump installation complies with NFPA 20. Separation and protection are in accordance with licensing requirements, and/or other licensing basis commitments.
- Installation of hydrants is in compliance with NFPA 24, as applicable, and/or other licensing basis commitments.

- Water-tank installation is in accordance with NFPA 22 standards, as applicable, and/or other licensing basis commitments.

4. Construction Testing.

Observe a sample of construction testing and calibration activities for applicable components from the sample selected in subsections of Inspection Requirement 02.03. If possible, observe portions of construction-completion testing (hydrostatic testing and fire-pump performance testing). If testing cannot be observed, examine records of completed tests. Determine whether:

- (a) The latest revisions of applicable procedures and/or specifications are available at the work location and used by personnel performing the testing and calibration.
- (b) Properly identified, traceable and calibrated measuring and test equipment are used.
- (c) Equipment or components calibrated are able to obtain the set point, degree of accuracy, and/or tolerance specified or otherwise noted.
- (d) Required testing and calibration results are recorded during the activity, not after the work has been completed.
- (e) Components are adequately identified as having been tested or calibrated.
- (f) Personnel performing the testing and calibration are properly qualified.
- (g) Test and calibration personnel adhere to any special handling or removal requirements.
- (h) Proper flushing and hydrostatic testing of the fire-loop water piping are completed.

5. Configuration management. For the activities observed during Inspection Requirement 02.03., verify if changes occurred during these construction activities, the applicant/licensee properly controlled and documented these changes for engineering review, approval, and subsequent incorporation into the final as-built drawings, as applicable. Verify these actions were completed in accordance with their procedures and management measures, as applicable.

03.04 Inspection Requirement 02.04

Ascertain whether for the safety-significant fire protection system construction activities, the applicant/licensee/contractor system for documenting safety-significant work is functioning in accordance with requirements.

- a. Receipt Inspection and Material Certification. Select records applicable to the receipt of lots or shipments. Select records applicable to the storage, and storage inspection of lots or groups of fire protection system, components and associated items.

1. Records confirm that required material characteristics, performance tests, nondestructive tests, environmental qualification tests, and other specification requirements are met.
2. Receipt inspection and storage records indicate that, where appropriate, defective or incorrect components, parts, and materials are controlled and prevented from installation and possible use.
3. Documentation has been prepared and maintained as required by receipt inspection and documentation storage instructions.

b. Installation Inspection.

1. Records confirm that specified materials and components were installed as specified and that the required construction inspections were performed, and acceptance criteria are defined.
 - (a) Review licensee and contractor requirements covering the span of records for fire protection systems. Determine the initiation point for those records sampled and, importantly, the effectiveness of those responsible for reviewing the records for accuracy and completeness and ensuring that the recorded information meets documentation requirements. Installation records include, as applicable:
 - (1) leveling, alignment, clearances;
 - (2) anchoring installation;
 - (3) backfill and soil composition;
 - (4) cleanliness; and
 - (5) flushing.
 - (b) Most recent and approved design and construction documents were used during installation.
 - (1) Specified instrument components and associated items were installed in the location specified or otherwise noted.
 - (2) Materials and methods used for supports and anchors (including welds) met applicable specifications.
 - (3) Required inspections were performed, recorded, reviewed, and evaluated by qualified personnel.
 - (4) Inspection records were complete and satisfied documentation requirements.

c. Construction Testing.

1. Calibration data records for process instruments should include information and data specified by industry standards which the licensee is committed to such as:
 - (a) The specific identity of the measuring and test equipment used to perform the calibration.
 - (b) The “as-left” calibration data.

- (c) Date of calibration.
 - (d) Identity of the technician performing the calibration.
 - (e) Approval signature of a responsible individual.
 - (f) Certificates of calibration should be available at the site for measuring and testing equipment used to perform these calibrations. These certificates should show that the standards used to establish the accuracy of the test equipment are traceable to a nationally recognized standard.
2. Construction testing records include as applicable, hydrostatic test; and fire-pump full load operational and automatic starting tests.
 3. Required tests were performed and results meet acceptance criteria.
 - (a) Records indicate that approved procedures and equipment were used.
 - (b) Test equipment was periodically checked and calibrated as specified.
 - (c) Test data and results were properly documented and evaluated, and corrective action, if required, was taken.
- d. Nonconformance/Deviation Record(s).
1. Records include current status of these items. Nonconformance reports include the status of corrective action or resolution, (e.g., determine whether adequate corrective action is being taken when test results are not within tolerance or acceptance criteria.)
 2. For the inspection, review and evaluate a sampling of reports applicable to nonconformances or deviations. Determine whether:
 - (a) Records are complete and promptly reviewed by qualified personnel.
 - (b) Records have been routinely processed, evaluated in a timely manner and controlled through established channels, for resolution of the root-cause as well as the immediate problem.
 - (c) Records are properly identified and stored, indicate current status, and can be retrieved in a reasonable time.
 - (d) Nonconformance reports include the status of corrective action or resolution, and adequate justification is provided for use-as-is disposition.
- e. Training/Qualification Records of Craft, and Quality Inspection Personnel. Records establish that quality inspection personnel, as applicable, are adequately qualified for their assigned duties and responsibilities and that craft personnel have been trained in their assigned tasks. Records are complete and current and show which activities inspectors are qualified to perform.
- f. Configuration Management Records. Review and evaluate a selected sample of configuration management records, and determine whether:

1. Records associated with design and field changes, as well as related work and IP changes, reflect that timely review and evaluation of design and field change documents have been performed by personnel who are qualified.
2. Records of periodic inspections ensure that only the most recent approved documents, including design changes, were used in the field.
3. Design changes are subject to adequate design control, including consideration of the impact of the change on the overall design and on as-built records.
4. Records of nonconformance's to design requirements include preparation of a nonconformance report even if the nonconformance is resolved through the design-change process.

03.05 Additional Guidance

Note: Personnel Interviews. Informal interviews with field-craft and inspection personnel may be randomly conducted to determine how well employees know the requirements of their work activity. Ascertain whether a sufficient number of adequately qualified quality control inspection personnel, if required, are at the construction site, commensurate with the work in-progress, and adequately performing their assigned duties through the established organizational structure.

88200.L-04 RESOURCE ESTIMATE

This appendix is intended to provide inspection requirements and guidance applicable to a wide variety of potential construction projects at both existing and new fuel cycle facilities (FCFs). These projects may vary greatly in scope, complexity, and potential risk to public health and safety. Recommended inspection scope and hours for a specific new FCF will be documented in the principal inspection plan (PIP) for that facility developed in accordance with Inspection Manual Chapter (IMC) 2694, "Fuel Cycle Facility Construction and Pre-Operational Readiness Review Inspection Program."

Additionally, this IP can be used to provide additional inspection guidance for plant modification inspections at existing facilities but is not required to be implemented for these projects. Use of this appendix, or sections of this appendix, for modifications at existing FCFs, would be done on a case-by-case basis, in accordance with IMC 2600, Appendix B, "NRC Core Inspection Requirements."

88200.L-05 PROCEDURE COMPLETION

This IP is complete when the applicable appendices or applicable appendix sections are completed for the facility, as determined by the PIP. Inspectors are not expected to complete every activity in the appendices of this IP. Instead, inspectors should prioritize inspection activities based on 1) importance of the activity to safety, 2) availability of the onsite activity at the time of the inspection, and 3) available inspection resources. This appendix does not need to be completed if there are no SSIS covered by this appendix at a FCF.

88200.L-06 REFERENCES

Refer to licensing basis requirements for applicable codes and standards for each fuel facility.

NFPA 13, 14, 20, 22, and 25, and/or other applicable referenced NFPA standards, American Water Works Association, American National Standards Institute and American Society for Testing and Materials codes.

END

List of Attachments:

1. Revision History Table (mandatory)

Attachment 1: Revision History for IP 88200 Appendix L

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional Non-Public Information)
	ML24332A170 05/28/25 CN 25-014	Initial Issuance. Discipline specific appendix developed to provide technical inspection guidance for new construction and major modifications activities for fuel facilities with varying technologies, size, licensing requirements, etc.	N/A	N/A